Vol 2 Pt 3

ANNALS OF THE ROYAL OBSERVATORY, CAPE OF GOOD HOPE.

VOL. II. PART I.

OBSERVATIONS

OF THE

GREAT COMET, 1882. II.

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ERRATA.

ANNALS OF THE ROYAL OBSERVATORY, CAPE OF GOOD HOPE, VOL. II., PART I.

p. 14. On date Feb. 13, under heading "Star" for O.A. $\begin{cases} 4593 \\ 4594 \end{cases}$ read *, also delete note in fifth line from bottom of page.

p. 16. On Feb. 10, and in the four following lines, under heading "Authority" insert "Cape Obs." after the numeral.

p. 16. On Feb. 13. The comparison star (9th mag.) precedes O.A. 4593, almost exactly one minute of time. Its place for 1883·0 is—

$$\alpha = 5^h\ 58^m\ 15^s{\cdot}11\ ;\ \text{N.P.D.} = 108^\circ\ 59'\ 58''{\cdot}0,$$

from three Cape Observations made in 1886.

p. 18. On Feb. 13. The place of the Comet should be—

$$\alpha = 5^h\ 58^m\ 8^s{\cdot}88\ ;\ \text{N.P.D.} = 108^\circ\ 48'\ 52''{\cdot}5.$$

p. 23. The Declinations of Table IV*a* require a correction of $-0''{\cdot}46$ for co-latitude and flexure.

p 24. On Oct. 12, under heading R.A. read $155^\circ\ 42'\ 20''{\cdot}9$.

D. G.

i 19422*a*. 250.—5/86. Wt. 13031.

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OBSERVATIONS OF THE GREAT COMET OF 1882,

MADE AT THE

ROYAL OBSERVATORY, CAPE OF GOOD HOPE.

INTRODUCTION.

The comet was first seen here by Mr. W. H. Finlay, Chief Assistant, at about 17^h on 1882, Sept. 7, when on the way to his house after observing an occultation of 5 Cancri. Returning at once to the Equatoreal, Mr. Finlay secured comparisons with an 8th magnitude star (Arg. $-0°\cdot2229$), and this appears to be the first recorded observation of the Comet of any astronomical value.

The following morning, Sept. 8, an excellent series of measures of position angle and distance of the Comet from ι Hydræ was secured by Dr. Elkin with my Heliometer; and Mr. Finlay, with the 6-inch Equatoreal obtained satisfactory observations of $\Delta\alpha$ and $\Delta\delta$ between the Comet and the Star Arg. $-0°\cdot2256$.

My own hands were closely tied in the evening with Heliometer measures for Stellar parallax [it was then the epoch of maximum parallax for α Centauri with my comparison stars] and with measures of *Victoria* and *Sappho* extending far into the early morning. I, however, attempted to obtain observations on the morning of the 9th, but during the short time the Comet was visible between clouds I was unable to find a comparison star in the strong twilight.

A period of cloudy and rainy weather now set in, during which the Comet could only be occasionally seen before sunrise by glimpses between clouds, and it became evident that if observations were to be made at all some exceptional means must be adopted to secure them, means that would permit an absolute place to be secured from a single pointing whenever opportunity offered.

Accordingly, on Sept. 15, the photo-heliograph was dismounted and its portable observatory shifted to a site commanding the Eastern horizon, and the great Indian Theodolite* was erected under it. Two pointings on the Comet and on the limbs of the Sun were obtained the following morning between clouds, but there appears to have been some mistake in the readings due to haste, and to the then very imperfect adjustment of the instrument, so that the observations cannot be reconciled. The instrument in fact had till then never been used at the Cape, and was set up in haste by lamplight the previous evening, the erection of the observatory having occupied the whole day.

On Sunday, September (16 and 17) the Comet was visible during the greater part of the day, and a considerable number of observations were secured by Mr. Finlay and Dr. Elkin. The results are given in Table I.

* This instrument was constructed by Troughton and Simms, under the superintendence of Colonel Strange, for the great trigonometrical survey of India. It has been kindly lent to me by General Walker, with consent of the Government of India, for some special researches. The telescope has $3\frac{1}{2}$ inches aperture, the horizontal circle is 3 feet in diameter and the vertical circle 2 feet, reading by 5 and 2 or 4 microscopes respectively. Only two microscopes were used for the vertical circle in the observations of the Comet.

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On the afternoon of the same day the Comet was observed both by Mr. Finlay and Dr. Elkin to disappear at the Sun's limb.

	h.	m.	sec.	
Finlay -	4	50	58	Cape M. T.
Elkin -	4	50	52	„ „

It is now known that the Comet disappeared by projection on the Sun's disc. Detailed remarks by Mr. Finlay and Dr. Elkin on this most interesting observation will be found *Monthly Notices*, R. A. S., Vol. XLIII. pp. 21–24.*

On Monday (Sept. 17–18) another series of observations with the great Theodolite was secured by Mr. Finlay and Dr. Elkin, the results of which are also given in Table I.

The same day I had the good fortune to obtain a complete meridian observation of the Comet with the Transit Circle, and 10 minutes afterwards the Sun's Transit. I also obtained similar observations on Sept. 18 and 22. The results will be found in Table II. For some days after the 22nd the sky was clouded about noon, and the Comet had become too faint for daylight observation before fine weather returned.

On September 23 and 25 the weather was fine in the early morning, and the Comet was well seen, but no observations of its position were obtained with the Heliometer or the Equatoreal, because no comparison stars were visible so near the Sun.

On September 28 the Comet was sufficiently far from the Sun to permit comparison stars to be seen, and accordingly good observations were secured with both instruments, and systematically followed up thereafter.

The 7-inch Equatoreal does not command the Eastern horizon, and Filar Micrometer observations had to be made with the 6-inch Equatoreal till October 24, when observations were begun and continued with the 7-inch Equatoreal and Repsold Filar Micrometer till 1883, May 12. The results of the Equatoreal observations are given in Table III.

Dr. Elkin's Heliometer observations extend over the period 1882, Sept. 8–Nov. 21 inclusive; after the latter date the nucleus was found to be too faint and ill-defined for accurate observation with the limited aperture of the Heliometer. The results of the Heliometer observations are given in Table IV.

The Nucleus.

One of the chief uncertainties in deducing an accurate orbit from these observations will probably be found in determining what portion of the nucleus is to be regarded as the true centre of gravity of the mass of the Comet.

The successive changes in the form of the nucleus are well shown in the drawings by Dr. Elkin (Plate I.) and in those by Mr. Finlay (Plate II.). Dr. Elkin's drawings (except the sketch of Sept. 8) refer to the nucleus only, and are chiefly intended to illustrate the point bisected by him. Mr. Finlay's drawings show also the relation to the envelope, but are not shown to scale, as are those of Dr. Elkin.

* I myself lost this unprecedented observation by a necessary visit to Simon's Bay for the purpose of conferring with Captain Morris, R.E., with reference to the Geodetic Survey of South Africa, (of the field work of which he is now in charge). Captain Morris, as chief of the British Transit of Venus Expedition to Brisbane, was a passenger by the steamer "Liguria" to Australia, and the prevalence of small pox in Cape Town at the time had induced the owners of the vessel to order her to touch at Simon's Bay instead of Cape Town. I was thus absent during the eventful day in question.

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It is unquestionable that both on September 7 and 8 no duplicity of the more condensed portion of the nucleus could be detected with the optical means at our disposal, and this condensation became a smaller and more sharply defined perfectly circular disc as the Comet approached perihelion.

September 7. Mr. Finlay describes the Comet as very fine and bright, with large head and without distinct nucleus.

September 8. The nucleus is figured by both observers. Dr. Elkin describes it as 10″ or 15″ in diameter and strongly condensed in the centre.

From glimpses of the Comet obtained during the unfavourable period Sept. 9–15 the central condensation was observed to become smaller and more sharply defined.

September 17. The central condensation or nucleus was certainly single. Half-an-hour before its disappearance at the Sun's limb its diameter was 4″ according to Mr. Finlay's measures.

At transit on September 17 (September 18, civil reckoning) I found the diameter of this nucleus or central condensation certainly less than 4″, and this is confirmed by the drawing (Plate IV.) which I obtained on the afternoon of the same day.

At transit on September 18 I have described the appearance of the nucleus as similar to that of a 1st magnitude star and again at transit on September 22 as similar to that of a 3rd magnitude star seen by daylight.

On September 23 and 25 the weather was fine in the early morning, and although the strong twilight prevented observation of comparison stars, yet Mr. Finlay and I are certain that the nucleus was still single, nor was any appearance of elongation noted during the observations of September 28.

On September 30 the nucleus is figured both by Mr. Finlay and Dr. Elkin. The latter with the limited aperture of the Heliometer saw only an elongation of the central or most condensed part of the nucleus, whilst the former, with the 6-inch Equatoreal, figures a decided separation of the central condensation into two separate points of condensation. The disruption of the nucleus and the formation of separate points of condensation seems therefore to have commenced between September $28^d\ 17^h$ and September $30^d\ 17^h$ C.M.T.

In Mr. Finlay's notes (page 11), extracted from his observing journal, the elongated condensed portion of the nucleus is termed "*a jet*" on October 9 and 10, and "*a line of nuclei*" on October 12; whilst in the notes of Dr. Elkin the word *nucleus* is applied sometimes to the whole figure drawn by him, sometimes to the points of greatest condensation in the figure. This confusion of terms, however, will present no difficulty to the reader who studies the notes in connection with the plates.

If, for sake of simplicity, we define the nucleus as *that portion of the head of the Comet which is represented in Dr. Elkin's drawings* (Plate 1, figs. 2–15) we can state that Dr. Elkin observed with the Heliometer the centre of the nucleus till October 2 inclusive, the brighter (following) point of condensation on October 3, both the brighter and fainter of the two principal points of condensation on October 10, and the following (or brighter) point of condensation till November 11, and thereafter the estimated centre of the nucleus.

Similarly, Mr. Finlay observed with the Filar Micrometer the brighter (following) point of condensation till November 1 inclusive. Thereafter all the observers with the Equatoreal endeavoured to observe the centre of the nucleus. Towards the close of the observations, however, it became very difficult to estimate the limits of the nucleus, and it was found from nearly simultaneous observations in March and April that

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Mr. Finlay systematically observed a point as the estimated centre of the nucleus which followed that observed by Dr. Elkin. On comparing notes and making sketches of what each observer defined as the nucleus, it was found that Dr. Elkin included a somewhat larger portion of the Comet's head in his estimated nucleus than Mr. Finlay did; and the ill-defined oval patch of light which Mr. Finlay considered the nucleus was not symmetrically situated in the larger oval area which Dr. Elkin regarded as the nucleus. Each observer, however, adhered to his own estimation of the extent of the true nucleus-area, and the results are printed as derived from the original observations.

The measures of the length and position angle of the line of condensation, as given in the notes of Mr. Finlay and the Table of Dr. Elkin (Table IV*c*.), will permit the reduction of the observations to any desired portion of the nucleus.

To prevent possible misunderstanding, it may be well here to state that on Oct. 10 and 12 there was a faint point of condensation, visible with the 6-inch Equatoreal, following the brightest point of condensation. Mr. Finlay figures this in his drawings for these dates, but indicates clearly enough by intersecting lines that this very faint point was not observed, but the brighter point shown at the intersecting lines.

The Tail.

No exact drawings of the tail of the Comet were made during the earliest portion of its visibility, partly because the observers were fully occupied in obtaining observations necessary to determine the place of the Comet, and partly because from the Comet's proximity to the Sun the stars necessary for accurately defining the position of the tail were invisible in the strong twilight. Reproductions of some sketches by Mr. Finlay are given in Plate III.

I was so fully occupied with other observations that I was unable myself to devote much time to observation of the Comet till after October 11, when the *Sappho* observations were finished. It appears now to be certain that satisfactory pictures of the Comet might have been obtained by photography whenever it was visible during the period between Sept. 8 and Nov. 14.

So early as October 4 several photographers in South Africa had obtained impressions of the Comet with their ordinary photographic apparatus; amongst these were Mr. Shoyer of Cape Town, Mr. Simpson of the U. P. School, Aberdeen, and Mr. Fernyhough of Durban, Natal. Their photographs have no scientific value as representations of the Comet, since they were taken without means for following the comet during exposure. It happened that the axis of the brighter part of the tail was nearly parallel to the direction of the diurnal motion, and the head of the Comet being then sufficiently brilliant to produce a nearly instantaneous impression, the effect of diurnal motion was to create a very elongated impression of the nucleus, nearly coincident with the axis of the tail, and sufficient to lengthen the impression of the brighter portion of the tail, so that to the popular eye a very brilliant picture of the comet was the result. To Mr. Shoyer and Mr. Simpson I am, however, indebted for certain information that the comet might be photographed. But it is to Mr. Allis, a photographer in the neighbouring village of Mowbray, that science is indebted for the valuable pictures which I obtained with his assistance. No sooner had I called upon him, and explained the conditions necessary for success, than he at once volunteered all requisite aid. I had no suitable lens, and no

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experience in the development of modern sensitive dry plates; he was able to supply both, and entered into the work with heart and soul.

The lens employed was by Ross, (the work I believe of the late Mr. Dallmeyer,) of about 2½ inches aperture and 11 inches focal length. This lens, with its ordinary camera and dark slide, was attached to the declination axis of the 6-inch Equatoreal in such a way that any motion given to the telescope was also common to the camera. The cross, formed by the intersection of a pair of spider lines in the focus of the telescope, was now placed on the image of the nucleus of the Comet or upon that of a neighbouring star, and by means of clock work, aided by the slow motions in R.A. and Declination, was kept accurately upon the object during the whole exposure. In photographs 1, 3, and 4 the nucleus was followed, in 2, 5, and 6 a star was employed. Copies of the photographs are attached.

The dates and times of exposure are the following :—

			d.	h.	m.			m.
No. 1.	1882	October	19	15	45	Cape M. T.	Exposure	30
2.		October	20	15	30	,,	,,	60
3.		October	21	15	40	,,	,,	40
4.		Nov.	7	14	42	,,	,,	100
5.		Nov.	13	14	0	,,	,,	80
6.		Nov.	14	14	15	,,	,,	120

The anomalous tail or envelope projected towards the Sun is well seen in Nos. 4 and 6.

Royal Observatory,
Cape of Good Hope,
1885, August 12.

DAVID GILL.

Note.—In the following Tables the observer is designated as follows :—

Observations by D. Gill are marked G.
,, W. L. Elkin ,, E.
,, W. H. Finlay ,, F.
,, G. W. H. Maclear ,, M.

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OBSERVATIONS WITH THE INDIAN THEODOLITE.

These observations do not pretend to represent in any degree the accuracy attainable with this fine instrument.

The instrument was only taken from its packing cases and hurriedly mounted in a make-shift way for the emergency in question: the observers had no previous experience in the use of the instrument, and the adjustments were in a very imperfect state. Added to this, the observations on Sunday (Sept. 16-17) had to be made as opportunity offered, with such frequent interruption by cloud that the observers were obliged to bisect the Comet simultaneously in altitude and in Azimuth, a method by which the most accurate results cannot be obtained. Also, in consequence of the close proximity of the Comet to the Sun the Theodolite was exposed to the full rays of the Sun, as there was no time to arrange efficient shields to protect the instrument; thus the levels were greatly disturbed by the unequal expansion of the more and less exposed parts of the instrument.

All the observations with the Theodolite were referred to the Azimuth of an iron telegraph post about two miles distant, the Azimuth of which was determined by observations of the Sun on Sept. 18. The same post was also observed to determine the horizontal point for the vertical readings.

It is unfortunate that on September 16–17 observations were only obtained in one position of the instrument, and that no observations of the Sun were made on that day For these reasons the Theodolite observations may be subject to errors of possibly 10″ or 15″ of arc.

D. G.

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TABLE I.

OBSERVATIONS WITH THE INDIAN THEODOLITE.

Cape Mean Time.	Azimuth from North Point.	Zenith Distance.	Comet's Right Ascension.	Comet's Declination.	Parallax Factors. R.A.	Parallax Factors. Dec.	Position of Vertical Circle.
d h m s	° ′ ″	° ′ ″	h m s	° ′ ″			
Sept. 16 23 36 50·2	− 4 16 54·4	35 36 40·1	11 31 48·6	+1 35 59	−·002	−·578	Left
23 41 47·6	− 2 13 27·1	35 33 28·8	31 59·2	36 11	−·001	−·578	Left
17 0 10 51·7	+ 9 58 10·7	35 59 31·0	32 35·6	38 8	+·006	−·578	Left
0 37 54·0	+20 47 3·7	37 29 10·8	33 9·8	40 3	+·012	−·578	Left
0 44 48·8	+23 24 38·3	38 1 3·8	33 19·3	40 12	+·013	−·578	Left
0 51 40·4	+25 56 58·9	38 36 27·2	33 28·4	40 40	+·015	−·578	Left
0 58 7·8	+28 16 46·5	39 12 32·0	33 37·1	40 51	+·016	−·578	Left
1 0 13·3	+29 1 10·2	39 24 54·3	33 40·0	41 0	+·016	−·578	Left
1 5 25·6	+30 49 48·9	39 56 56·0	33 47·3	41 26	+·018	−·578	Left
1 10 25·2	+32 31 50·6	41 28 34·8	33 53·6	42 5	+·019	−·578	Left
1 13 49·2	+33 40 8·3	41 52 25·5	33 57·8	42 16	+·020	−·578	Left
23 30 34·61	− 5 21 1·1	35 31 4·3	31 55·9	27 47	−·003	−·576	Left
23 34 4·83	− 3 49 44·5	35 27 17·3	31 54·2	27 32	−·002	− 576	Left
23 36 17·97	− 2 51 46·7	35 25 31·2	31 53·0	27 24	−·002	−·576	Left
23 38 51·65	− 1 44 51·2	35 24 12·2	31 51·9	27 23	−·001	−·576	Left
23 42 29·85	− 0 9 41·7	35 23 19·0	31 50·1	27 15	·000	−·576	Left
18 0 5 30·58	+ 9 49 34·7	35 47 0·2	31 37·2	26 28	+·005	−·576	Right
0 18 10·30	+15 10 15·9	36 21 4·0	31 31·5	26 3	+·008	−·575	Right
0 21 51·49	+16 42 6·4	36 33 31·4	31 29·4	25 45	+·009	−·575	Right
0 24 29·06	+17 46 48·2	36 43 19·6	31 28·0	25 46	+·010	−·575	Right
0 41 39·54	+24 36 37·6	38 0 42·9	31 19·5	24 54	+·014	−·575	Right
0 45 18·04	+26 0 15·2	38 20 7·6	31 17·7	24 43	+·015	−·575	Right
0 56 50·64	+30 17 2·1	39 27 59·2	31 12·3	24 1	+·018	−·574	Right
1 0 24·66	+31 33 40·3	39 51 5·7	31 10·5	24 4	+·019	−·574	Right
1 6 49·40	+33 48 32·5	40 34 16·8	31 7·4	23 39	+·020	−·574	Right
1 24 53·74	+39 45 33·4	42 49 24·6	31 1·9	22 52	+·024	−·573	Left
1 33 9·58	+42 18 47·9	43 57 27·6	30 57·6	22 34	+·026	−·573	Left
1 37 4·13	+43 28 55·5	44 30 59·7	30 55·4	22 36	+·027	−·572	Left
1 40 26·78	+44 28 34·5	45 0 29·2	30 53·3	22 29	+·028	−·572	Left

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TABLE II.

OBSERVATIONS WITH THE TRANSIT CIRCLE.

Date.		Observer.	Cape Mean Time.			Apparent R.A.			No. of Wires.	Apparent N.P.D.			No. of bisections.	Parallax factor in N.P.D.
1882.			h	m	s	h	m	s		°	′	″		
September	17	G.	23	42	51·2	11	31	49·03	7	88	32	36·6	1	0·576
	18	G.	23	29	41·3	11	22	33·51	3	89	31	9·7	1	0·562
	22	G.	22	53	26·4	11	1	58·84	7	92	30	6·9	1	0·518
1883.														
January	9	M.	11	34	23·1	6	50	48·51	3	117	51	45·2	3	0·103
	11	M.		21	45·9		46	2·38	5	117	25	14·6	1	0·110
	12	M.		15	31·5		43	43·47	7	117	11	43·1	1	0·114
	13	M.		9	21·9		41	29·41	7	116	57	14·8	1	0·118
	15	M.	10	57	13·2		37	11·84	2	116	28	4·4	1	0·126
	16	M.		51	10·4		35	4·56	5	116	13	16·8	1	0·130
	17	M.		45	13·7		33	3·46	7	115	58	44·8	1	0·135
	19	M.		33	31·0		29	11·96	5	115	27	30·4	1	0·144
	21	M.		22	1·7		25	33·93	7	114	56	24·6	1	0·153
	24	M.		5	11·4		20	30·53	5	114	8	18·5	1	0·167
	25	M.	9	59	41·4		18	56·17	5	113	52	23·1	1	0·171
	26	M.		54	13·2		17	23·65	4	113	36	17·7	1	0·176
	27	M.		48	50·5		15	56·57	7	113	20	25·1	1	0·180
	28	M.		43	28·1		14	30·85	2	113	4	0·3	1	0·185
	29	M.		38	12·7		13	10·13	2	112	47	35·9	1	0·189
	30	M.		32	57·3		11	50·48	3					

NOTE.—The Meridian Observations of January 1883 were made by Mr. Maclear in the regular course of Meridian observing. He endeavoured to observe the brightest part of the nucleus.

NOTES BY W. H. FINLAY.

Sept. 7.—The comet is a very fine bright one, head large, but without distinct nucleus; bright as a star of the 3rd magnitude; tail about 2° long in slight moonlight and dawn.

Sept. 8.—Head and tail very bright, at some distance from the head the north side of the tail ceased. The nucleus was slightly south of the centre of the head. (*See* Plate II.)

Sept. 16–17.—The comet was followed all the morning with the Great Theodolite, being even conspicuous through clouds which were constantly passing. I followed it with the 6-inch equatoreal in the afternoon, and watched it up to the sun's limb, where it disappeared amidst the boiling of the limb at 4h. 50m. 58sec. Cape mean time. No trace of the comet could afterwards be detected on the sun. (*See Monthly Notices*, R.A.S., vol. xliii., No. 1.)

Sept. 23.—A long narrow extension of the south edge of the tail is visible, extending as far again as the main portion of the tail.

Sept. 30.—There seem to be two balls of light in the head, the smaller one being on the preceding and upper side, (fig.). The brighter one was the point observed. The

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upper wing is faint. To the naked eye the southern edge is sharp, but there is much faint light about the northern (fig.).

Oct. 1.—The two nuclei are further apart, position angle of line joining them = 92° 19′. The faint envelope round the bright tail is very conspicuous. There are two lines of least light in the tail, corresponding apparently to the axes of the two tails (fig.).

Oct. 9.—There seem to be several bright points in the jet, which take roughly $1^{s}\cdot5$ to cross the wire. Their direction makes a small angle as before with the parallel.

Oct. 10.—The brighter part of the tail curves up to the south at its end. The position angles between the brightest point in the jet (*i.e.* the one near the following end, which was always the one observed) and the preceding one = 99° 44′; the intermediate ones are slightly to the south of the line joining these two.

Oct. 12.—At 17h. c. m. t. length of line of nuclei = 39″·7.

Oct. 13.—Position angle between the two brightest points = 97° 0′; length of whole line of nuclei = 33″·4; distance between the point of observation and the nearest of the brighter points = 12″·2. The line of nuclei is curved (fig.).

Oct. 16.—Position angle of line = 103° 20′. Distance of nearest of the brighter points to point observed = 11″; whole length of line = 30″·1.

Oct. 24.—Position angle of line = 109°; the whole line takes about $2^{s}\cdot7$ to transit a wire.

Oct. 26.—Position angle of line = 111°; time of transit = $3^{s}\cdot3$, with daylight illumination of wires.

Nov. 1.—Line of nuclei takes about $3^{s}\cdot5$ to pass a wire.

[Mr. Finlay was absent from the observatory after this date in charge of the Transit of Venus party at Aberdeen Road station.]

1883.

Jan. 7.—The separate points not visible now; a point of greatest condensation nearer to the following end of the head than the centre was observed. Position angle of head from this = 212°. The comparison star, 6½ mag., was so close as to almost blot out the comet and rendered it a difficult object.

Jan. 13.—Position angle of head = 221°.

Jan. 27.—Position angle of head = 237°. Comet faintly visible to naked eye with the moon half an hour above the horizon. The tail is about equal in length to the distance between α and β Geminorum.

Jan. 28.—Position angle of head = 240°.

March 13.—Position angle of head = 267°.

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TABLE III.

OBSERVATIONS with the 6-inch Equatoreal.

Date.	Cape Mean Time.	Δ R.A. ★ − ✱	No. of Wires.	Δ N.P.D. ★ − ✱	No. of Bisections.	Star.	Observer.
1882.	h m s	m s		′ ″			
September 7	17 23 15·7	−0 29·06	14			Arg. −0°·2229	F.
,,	17 26 5·3			+ 2 58·0	8	,,	F.
8	17 20 10·5	−4 22·84	5			Arg. −0°·2256	F.
,,	17 27 16·7			+ 3 53·2	5	,,	F.
28	16 48 49·3	+9 48·96	3	− 8 15·4	3	Lalande 20659	F.
30	16 44 8·7	−2 25·44	13	− 0 58·0	13	W.B. X. 764	F.
October 1	16 28 29·8	+3 47·94	8	− 6 35·5	8	W.B. X. 620	F.
3	16 14 34·7	−0 17·70	6			W.B. X. 629	F.
,,	16 23 55·2			+10 22·9	5	,,	F.
,,	16 27 44·9	−8 9·04	2	+ 0 42·2	2	Stone 5992	F.
,,	16 48 42·7	+1 50·76	2	− 8 16·1	2	W.B. X. 587	F.
9	16 39 6·4	+0 53·85	1	+ 9 25·0	1	W.B. X. 435	F.
10	16 15 5·8	+1 11·52	10	− 8 2·3	10	W.B. X. 408	F.
,,	16 9 6·2	−4 28·51	4	+ 5 52·6	4	W.B. X. 511	F.
11	16 35 22·4	+0 59·38	8	− 0 34·4	8	W.B. X. 388	F.
12	16 5 48·6	+3 18·55	9	+ 4 7·7	9	✱	F.
13	15 56 46·5	+1 33·67	10	+ 6 33·9	10	W.B. X. 320	F.
14	16 6 59·6	+2 1·84	6	− 0 46·8	6	W.B. X. 282	F.
,,	16 21 1·2	+4 48·35	2	− 7 51·1	2	W.B. X. 236	F.
16	16 22 16·7	+0 40·95	6	+ 0 27·7	6	✱	F.
20	16 40 17·8	+1 42·97	4	− 5 39·5	4	Lalande 19967	F.
21	16 25 47·0	−3 56·57	5	+ 5 19·7	5	✱	F.
22	16 21 25·1	−1 8·87	11	+ 2 35·4	11	O.A. 10490	F.

OBSERVATIONS with the 7-inch Equatoreal.

October	24	15 45 21·5			− 4 0·3	8	O.A. 10429	F.
	,,	15 45 35·4	+1 12·53	20			,,	F.
	25	16 35 58·2			− 2 23·0	12	O.A. 10428	F.
	,,	16 49 18·2	−0 8·77	18			,,	F.
	26	16 0 34·1	−1 43·28	20			✱	F.
	,,	16 1 30·1			+ 2 27·5	8		F.
November	1	15 47 27·1			+ 6 6·7	8	✱	F.
	,,	15 48 15·6	−2 11·96	23				F.

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TABLE III.—*continued.*

In the Observations which follow, the centre of the nucleus, or patch of light, was supposed to be observed: towards the end of the series, however, it was found that F. always observed a more condensed part which slightly followed this centre.

Date.	Cape Mean Time.	Δ R.A. ☄ − ✱	No. of Wires.	Δ N.P.D. ☄ − ✱	No. of Bisections.	Star.	Observer.
1882.	h m s	m s		′ ″			
November 23	12 1 0	−0 53·21	24	+ 3 32·3	12	O.A. 9439	E.
24	12 4 59	+0 11·49	30	+ 0 10·3	12	O.A. 9457	E.
25	13 28 33	−0 50·61	—	−12 27·3	—	O.A. 9435	G.
26	12 32 42	−0 39·69	—	+ 0 27·8	—	Washington 3845	G.
27	11 32 56	−3 41·59	25	− 3 6·7	6	O.A. 9383	E.
28	11 22 15	−0 31·80	24	+ 3 6·9	16	O.A. 9272	E.
29	11 1 27	−0 16·27	24	+ 3 15·5	16	Stone 4772	E.
30	12 51 4	−0 52·73	15	+ 0 3·3	8	✱	E.
December 1	12 27 46	−3 24·34	20	− 4 7·0	8	Stone 4746	E.
2	10 50 10	+0 16·83	—	− 1 28·1	—	Stone 4676	G.
,,	11 16 10	+0 13·21	12	− 1 12·3	6	,,	E.
3	11 11 56	+0 42·06	4	− 8 35·1	4	Stone 4628	E.
4	11 28 5	−2 18·97	30	− 1 44·8	10	Stone 4628	E.
8	11 11 20	+2 4·07	30	− 0 15·8	8	Stone 4401	E.
9	11 20 2	−1 5·48	30	+ 6 42·5	10	Stone 4401	E.
10	10 43 25	+1 58·13	30	+ 7 48·2	8	Stone 4318	E.
12	12 47 33	−0 45·10	24	− 2 43·0	8	✱	E.
13	11 43 31	+0 1·23	24	−10 44·3	8	Stone 4236	E.
14	11 12 17	−0 4·31	24	− 1 54·6	12	✱	E.
15	11 10 15	+0 55·04	24	− 8 20·2	8	✱	E.
16	10 33 53	−2 13·74	30	− 6 37·8	8	✱	E.
17	10 55 7	−0 46·31	24	− 6 40·8	8	✱	E.
18	10 33 31	+0 39·28	27	+ 1 30·8	10	✱	E.
24	10 31 12	+0 34·63	24	+ 3 22·9	6	✱	E.
,,	10 41 3	+0 33·57	24	+ 3 25·8	8	✱	F.
28	9 12 46	+0 22·63	20	+ 2 43·0	10	✱	E.
29	9 20 45	+1 42·47	14	−10 46·1	4	Stone 3624	E.
30	9 56 47	−0 21·13	40	+ 8 55·1	12	O.A. 6721	E.
1883.							
January 6	9 58 31	+0 58·35	16	+ 1 21·1	8	✱	F.
7	9 45 46	−0 5·35	16	− 1 40·0	8	Stone 3358	F.
9	9 52 13	−0 46·04	9	− 0 32·8	4	✱	F.
10	9 18 2	−0 45·80	18	+ 2 36·6	12	O.A. 5873	F.
13	9 7 52	−1 53·49	20	+ 1 47·2	8	✱	F.
14	8 59 40	+0 59·29	20	− 0 38·9	8	✱	F.
27	8 44 15	−1 5·96	20	− 0 41·0	8	✱	F.
28	8 30 15	−0 36·18	15	+ 1 5·5	8	O.A. 4972	F.
29	8 31 15	−0 42·51	12	− 0 10·3	8	✱	F.
,,	8 57 5	−0 43·91	15	− 0 44·5	8	✱	E.
February 2	12 5 54	+0 16·94	24	− 2 13·0	8	O.A. 4790	E.
3	11 35 51	+0 17·72	24	− 1 33·9	10	O.A. {+765 +766}	E.
4	11 42 49	−0 49·79	32	− 3 45·2	12	O.A. 4769	E.
5	11 40 19	−0 59·76	30	+ 2 3·7	10	O.A. 4740	E.
,,	12 12 18	−1 0·90	14	+ 1 49·0	8	,,	F.
6	11 54 2	−0 34·67	24	− 1 33·9	12	O.A. 4699	E.
7	12 2 33	−1 52·25	15	− 7 51·0	8	Lal. 11775	F.
8	11 44 2	+0 7·97	20	+ 9 55·7	16	,, 11677	E.
9	12 18 51	−0 43·16	20	− 6 2·9	8	,, 11677	F.
10	11 40 0	+0 34·56	32	+ 5 13·5	16	O.A. 4608	F.
,,	12 0 5	+0 31·27	30	+ 5 2·5	16	,,	E
,,	12 0 5	+0 31·64	—	+ 4 54·9	—	,,	G.

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TABLE III.—*continued.*

Date.		Cape Mean Time.			Δ R.A. ☄ − ✳	No. of Wires.	Δ N.P.D. ☄ − ✳	No. of Bisections.	Star.	Observer.
1883.		h	m	s	m s		′ ″			
February	11	10	57	42	+0 7·16	24	+ 2 49·3	8	O.A. {4597 4598}	E.
	,,	10	57	42	−0 11·04	21	+ 4 12·5	8	O.A. 4606	E.
	13	11	8	24	−0 8·08	32	−11 23·0	14	O.A. {4593 4594} †	E.
	14	11	20	7	+0 9·81	32	− 0 43·5	10	Lal. 11503	E.
	27	9	17	50	−0 24·28	25	+ 5 56·8	12	O.A. 4470	E.
March	3	10	49	42	+0 7·90	30	+ 0 12·8	16	✳	E.
	,,	11	10	7	+0 8·35	18	− 0 1·6	12	,,	F.
	4	10	8	40	+0 20·75	30	+ 1 5·2	16	✳	E.
	6	10	0	18	+0 10·66	36	− 0 4·2	10	✳	E.
	,,	10	30	0	+0 11·72	21	− 0 12·1	10	,,	F.
	8	9	19	44	−0 44·75	40	−14 4·2	16	W.B. V. 1286	E.
	9	10	54	42	−0 24·75	21	+16 22·8	10	W.B. V. 1274	E.
	11	11	3	40	−0 19·27	27	− 6 25·8	10	W.B. V. 1274	E.
	13	9	3	9	−1 26·37	19	− 6 12·7	12	W.B. V. 1312	F.
	,,	9	32	17	−1 28·47	36	− 6 36·3	12	,,	E.
	14	9	26	9	−1 8·52	35	− 4 1·3	10	✳ 9 Mag.	E.
	,,	9	54	0	−1 6·53	20	− 4 2·7	10	,,	F.
	15	10	49	20	−0 37·97	14	− 0 9·8	6	✳ 9·5 Mag.	F.
	,,	11	24	36	−0 42·32	15	− 0 31·2	10	,,	E.
	28	8	48	12	−0 39·41	16	+ 5 40·6	8	W.B. V. 1382	E.
	,,	8	50	51	−0 38·59	16	+ 5 35·5	8	,,	F.
	29	7	57	4	−0 20·04	16	− 2 44·5	8	,,	E.
	,,	8	27	28	−0 18·83	24	− 2 38·9	8	,,	F.
	30	8	44	16	−0 14·57	20	− 4 9·9	10	W.B. V. 1388	E.
	,,	9	4	6	−0 13·42	6			,,	F.
	31	8	47	19	+0 27·52	12	−10 15·3	10	W.B. V. 1381	F.
	,,	9	29	36	+0 28·47	14	−10 31·3	10	,,	E.
April	4	8	33	31	−2 23·02	16	+ 3 4·1	12	W.B. V. 1497	E.
	,,	9	13	18	−2 21·80	16	+ 2 52·0	6	,,	F.
	5	8	30	18	−1 59·36	25	− 4 31·1	10	,,	E.
	,,	8	38	30	−1 57·56	16	− 4 27·8	10	,,	F.
	6	8	50	29	−1 32·44	19	−12 5·1	12	,,	E.
	7	8	5	21	−1 12·47	20	+ 1 25·7	10	W.B. V. 1503	F.
	,,	8	47	10	−1 13·13	20	+ 1 7·1	10	,,	E.
	9	7	37	49	−1 10·80	24	− 8 5·1	10	W.B. V. 1524	E.
	,,	8	20	9	−1 9·35	18	− 8 14·4	10	,,	F.
	‡29	7	40	0	+0 0·8		+ 1 52			F.
	,,	7	40	0	+0 1·4		+ 1 26			E.
	30	7	18	22	−1 22·89	16	+ 5 6·0	8	✳ 8 Mag.	E.
	,,	7	26	47	−1 19·38	11	+ 5 10·7	10	,,	F.
May	‡1	7	23		−0 44·9		− 0 12			F.
	,,	7	23		−0 46·6		− 0 24			E.
	‡2	7	5		−0 5·3		− 4 12			E.
	,,	7	5		−0 9·3		− 3 27			F.
	‡12	7	20		(−0 34·9)		(+12 30)		Lal. 12297	{E. F.

† The Right Ascension given by Argelander is 1ᵐ too great.

‡ Owing to the proximity of small stars on these nights, the comet could not be observed in the usual manner Diagrams of its position with reference to several stars about it, and estimates of the ratios of its distances from them, were made independently by each observer, and the comet's place deduced from these. The position on May 12 may be considerably in error, as the small comparison stars were not well connected with Lalande 12297.

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Table III*a*.

Mean Places of the Comparison Stars.

Note.—The dates in the first Column give the dates on which the Stars were used for the Comet.

Date.	Mean Places, 1882·0.		Authority.	Reduction to Apparent Place.	
	Right Ascension.	N.P.D.			
1882.	h m s	° ′ ″		s	″
September 7	9 32 11·78	90 56 41·1	2 Merid. Obs. Cape	+1·82	+10·7
8	9 44 23·17	90 52 19·1	2 „ „	+1·82	+11·1
28	10 35 57·00	95 57 30·1	1 Merid. Obs. and Paris	+1·98	+11·9
30	10 44 3·30	96 51 25·9	2 Merid. Obs. Cape	+1·98	+12·1
October 1	10 35 57·10	97 26 20·8	3 „ „	+2·03	+11·7
3	10 36 32·44	98 6 40·1	Weisse's Bessel	+2·05	+11·7
„	10 34 21·45	98 25 48·6	„	+2·06	+11·6
„	10 44 22·95	98 16 22·2	Stone	+2·04	+11·8
9	10 26 10·29	100 49 0·8	1 Merid. Obs. Cape	+2·17	+11·1
10	10 24 29·65	101 31 43·2	1 „ „	+2·19	+10·9
„	10 30 10·47	101 17 40·2	2 „ „	+2·18	+11·1
11	10 23 18·56	101 49 54·9	2 „ „	+2·22	+10·9
12	10 19 39·72	102 9 50·7	2 „ „	+2·25	+10·8
13	10 20 4·51	102 32 4·9	2 „ „	+2·26	+10·7
14	10 18 15·62	103 4 12·1	2 „ „	+2·29	+10·6
„	10 15 28·74	103 11 35·2	Weisse's Bessel	+2·29	+10·4
16	10 16 13·75	103 52 21·8	2 Merid. Obs. Cape	+2·33	+10·4
20	10 10 34·12	105 33 17·9	3 „ „	+2·43	+10·0
21	10 14 53·37	105 45 27·2	2 „ „	+2·44	+10·2
22	10 10 44·08	106 11 18·7	2 „ „	+2·47	+10·0
24	10 5 38·14	107 3 16·6	1 „ „	+2·54	+ 9·7
25	10 5 33·31	107 24 40·8	2 „ „	+2·56	+ 9·7
26	10 5 42·18	107 42 23·7	2 „ „	+2·59	+ 9·7
November 1	9 57 3·13	109 51 16·2	2 „ „	+2·77	+ 9·3
23	9 9 5·86	116 54 41·1	2 „ „	+3·56	+ 8·9
24	9 7 12·60	117 13 35·7	Oeltz. Arg.	+3·60	+ 8·9
25	9 5 27·48	117 42 9·8	„	+3·63	+ 9·0
26	9 2 43·77	117 43 22·7	Washington 1860	+3·67	+ 9·1
27	9 3 9·81	118 0 31·8	Oeltz. Arg.	+3·70	+ 9·2
28	8 57 16·00	118 7 55·0	„	+3·75	+ 9·2
29	8 54 15·23	118 20 55·3	Stone	+3·78	+ 9·3
30	8 51 48·32	118 37 37·0	2 Merid. Obs. Cape	+3·82	+ 9·4
December 1	8 51 29·62	118 53 33·8	Stone	+3·85	+ 9·5
2	8 45 5·46	119 1 28·0	„	+3·89	+ 9·6
3	8 41 39·87	119 19 38·0	„	+3·93	+ 9·6
4	8 41 39·87	119 19 38·0	„	+3·96	+ 9·8
8	8 25 2·59	119 55 53·2	„	+4·11	+10·2
10	8 18 54·40	120 0 44·9	„	+4·15	+10·5
12	8 13 28·54	120 22 8·9	3 Merid. Obs. Cape	+4·23	+10·8
13	8 11 8·66	120 33 49·6	Stone	+4·26	+11·0
14	8 8 5·73	120 28 9·8	Stone 4236	+4·28	+11·2
15	8 3 53·32	120 37 3·3	2 Merid. Obs. Cape	+4·31	+11·3
16	8 3 53·32	120 37 3·3	2 Merid. Obs. Cape	+4·34	+11·5
17	7 59 9·48	120 38 11·2	2 „ „	+4·36	+11·7
18	7 54 33·79	120 30 10·0	2 „ „	+4·39	+11·8
24	7 35 32·25	120 14 53·0	2 „ „	+4·51	−12·9
28	7 23 37·67	119 52 38·0	Stone 3624	+4·58	+13·6
29	7 19 17·49	119 59 17·2	Stone	+4·58	+13·7
30	7 18 19·17	119 31 26·2	Oeltz. Arg.	+4·60	+14·0

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TABLE III*a*—*continued.*

Date.		Mean Places, 1883·0. Right Ascension.			Mean Places, 1883·0. N.P.D.			Authority.	Reduction to Apparent Place.	
		h	m	s	°	′	″		s	′
1883.										
January	6	6	57	33·80	118	28	30·5	3 Merid. Obs. Cape	+2·28	+10·0
	7	6	56	4·92	118	19	27·3	Stone	+2·29	+10·4
	9	6	51	44·08	117	53	12·0	3 Merid. Obs. Cape	+2·29	+11·0
	10	6	49	22·02	117	36	53·8	3 „ „	+2·28	+11·4
	13	6	43	33·69	116	56	25·0	2 „ „	+2·27	+12·3
	14	6	38	30·38	116	44	22·7	4 „ „	+2·26	+12·7
	27	6	17	6·34	113	21	6·9	2 „ „	+2·13	+15·6
	28	6	15	12·56	113	3	18·6	2 „ „	+2·11	+15·8
	29	6	13	55·58	112	48	30·0	3 „ „	+2·10	+16·0
February	2	6	7	44·37	111	43	3·8	Oeltz. Arg.	+2·03	+16·5
	3	6	6	37·90	111	26	43·4	„ „	+2·01	+16·6
	4	6	6	40·01	111	12	43·7	„ „	+2·00	+16·8
	5	6	5	48·34	110	50	55·2	„ „	+1·99	+16·9
	6	6	4	23·68	110	38	31·6	„ „	+1·97	+17·0
	7	6	4	45·10	110	28	57·8	3 Merid. Obs. Cape	+1·96	+17·1
	8	6	1	49·89	109	55	36·8	2 Paris Obs.	+1·94	+17·2
	10	5	59	44·94	109	29	1·6	2 „ „	+1·90	+17·3
	11	5	59	24·69	109	16	22·8	3 „ „	+1·88	+17·4
	„	5	59	43·31	109	15	6·6	3 „ „	+1·88	+17·4
	13	5	58	15·30	108	59	55·3	2 „ „	+1·85	+17·5
	14	5	57	16·36	108	33	59·2	2 „ „	+1·83	+17·5
	27	5	52	22·98	105	25	14·7	Oeltz. Arg.	+1·60	+17·9
March	3	5	51	7·43	104	38	48·0	1 Merid. Obs. Cape	+1·53	+17·9
	4	5	50	48·02	104	25	58·2	{ Stone 2696 and ✻ of Mar. 3rd }	+1·51	+17·9
	6	5	50	48·65	104	2	42·5	Stone 2696	+1·48	+17·9
	8	5	51	41·38	103	53	10·8	Weisse's Bessel	+1·44	+17·9
	9	5	51	21·46	103	10	24·3	„ „	+1·43	+17·8
	11	5	51	21·46	103	10	24·3	„ „	+1·39	+17 8
	13	5	52	38·46	102	49	8·9	„ „	+1·36	+17·7
	14	5	52	24·89	102	35	52·0	W.B. V. 1312	+1·34	+17·7
	15	5	52	6·96	102	20	57·1	W.B. V. 1186 and Lal. 11197	+1·32	+17·7
	28	5	55	12·95	100	11	12·2	Weisse's Bessel	+1·12	+17·2
	30	5	55	30·73	100	4	6·1	„ „	+1·09	+17·1
	31	5	55	9·59	100	2	0·2	„ „	+1·06	+17·1
April	4	5	59	38·13	99	17	10·6	„ „	+1·02	+16·9
	7	5	59	45·08	98	56	36·9	„ „	+0·98	+16·7
	9	6	0	36·92	98	51	58·4	„ „	+0·95	+16·7
	29	6	10	24·0	96	47	6	Lal. 11904	+0·73	+15·3
	30	6	12	26·2	96	40	59	„ „	+0·73	+15·3
May	1	6	12	26·2	96	40	59	„ „	+0·72	+15·2
	2	6	12	26·2	96	40	59	„ „	+0·72	+15·2
	12	6	19	23·4	95	47	18	Lal. 12297	+0·66	+14·3

In cases where differential observations of a small comparison star were made at the time from some known or brighter star, the "authority" quoted is that for the place of such known or brighter star, unless the faint star was afterwards observed on the meridian.

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Table III*b*.

Apparent Places of Comet.

Date.		Cape Mean Time.			Right Ascension.			Parallax Factor in R.A.	North Polar Distance.			Parallax Factor in N.P.D.	Observer.
1882.		h	m	s	h	m	s		°	′	″		
September	7	17	23	15·7	9	31	44·54	−·054					F.
	,,	17	26	5·3					90	59	49·8	+·551	F.
	8	17	20	10·5	9	40	2·15	·054					F.
	,,	17	27	16·7					90	56	23·4	·552	F.
	28	16	48	49·3	10	45	47·94	·055	95	49	26·6	·540	F.
	30	16	44	8·7	10	41	39·84	·055	96	50	40·0	·533	F.
October	1	16	28	29·8	10	39	47·07	·058	97	19	57·0	·537	F.
	3	16	14	34·7	10	36	16·79	·054					F.
	,,	16	23	55·2					98	17	14·7	·528	F.
	,,	16	48	42·7	10	36	14·27	·054	98	17	44·1	·519	F.
	,,	16	27	44·9	10	36	15·95	·054	98	17	16·2	·526	F.
	9	16	39	6·4	10	27	6·31	·052	100	58	36·9	·484	F.
	10	16	15	5·8	10	25	43·36	·054	101	23	51·8	·497	F.
	,,	16	9	6·2	10	25	44·14	·054	101	23	43·9	·502	F.
	11	16	35	22·4	10	24	20·16	·052	101	49	31·4	·477	F.
	12	16	5	48·6	10	23	0·52	·053	102	14	9·2	·492	F.
	13	15	56	46·5	10	21	40·44	·054	102	38	49·5	·490	F.
	14	16	6	59·6	10	20	19·75	·053	103	3	35·9	·478	F.
	,,	16	21	1·2	10	20	19·38	·052	103	3	54·5	·464	F.
	16	16	22	16·7	10	16	57·03	·050	103	52	59·9	·450	F.
	20	16	40	17·8	10	12	19·52	·047	105	27	48·4	·406	F.
	21	16	25	47·0	10	10	59·24	·048	105	50	57·1	·412	F.
	22	16	21	25·1	10	9	37·68	·048	106	14	4·1	·405	F.
	24	15	45	21·5	10	6	53·22	·051	106	59	26·0	·419	F.
	25	16	35	58·2	10	5	27·89	·043	107	22	27·5	·365	F.
	26	16	1	30·1	10	4	1·43	·047	107	45	0·9	·390	F.
November	1	15	47	27·1	9	54	54·00	·047	109	57	32·2	·354	F.
	23	12	1	0	9	8	16·21	·060	116	58	22·3	·396	E.
	24	12	4	59	9	7	27·69	·059	117	13	54·9	·380	E.
	25	13	28	33	9	4	40·50	·047	117	29	51·5	·240	G.
	26	12	32	42	9	2	7·75	·053	117	43	59·6	·308	G.
	27	11	32	56	8	59	31·92	·060	117	57	34·3	·388	E.
	28	11	22	15	8	56	47·95	·061	118	11	11·1	·392	E.
	29	11	1	27	8	54	2·74	·062	118	24	20·1	·417	E.
	30	12	51	4	8	50	59·41	·048	118	37	49·7	·233	E.
December	1	12	27	46	8	48	9·13	·050	118	49	36·3	·252	E.
	2	10	50	10	8	45	26·18	·061	119	0	9·5	·393	G.
	,,	11	16	10	8	45	22·56	·061	119	0	25·3	·353	E.
	3	11	11	56	8	42	25·86	·060	119	11	12·5	·350	E.
	4	11	28	5	8	39	24·86	·057	119	21	32·6	·305	E.
	8	11	11	20	8	27	10·77	·053	119	55	47·6	·282	E.
	9	11	20	2	8	24	1·22	·052	120	2	45·9	·258	E.
	10	10	43	25	8	20	56·68	·058	120	8	43·6	·304	E.
	12	12	47	33	8	12	47·67	·031	120	19	36·7	·116	E.
	13	11	43	31	8	11	14·15	·044	120	23	16·3	·183	E.
	14	11	12	17	8	8	5·70	·049	120	26	26·4	·214	E.
	15	11	10	15	8	4	52·67	·048	120	28	54·4	·208	E.
	16	10	33	53	8	1	43·92	·052	120	30	37·0	·245	E.
	17	10	55	7	7	58	27·53	·049	120	31	42·1	·208	E.
	18	10	33	31	7	55	17·46	·051	120	31	52·6	·220	E.
	24	10	31	12	7	36	11·39	·043	120	18	28·8	·179	E.
	,,	10	41	3	7	36	10·33	−·042	120	18	31·7	+·162	F.

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TABLE III*b*—*continued.*

Date.		Cape Mean Time.	Right Ascension.	Parallax Factor in R.A.	North Polar Distance.	Parallax Factor in N.P.D.	Observer.
1882.		h m s	h m s		° ′ ″		
December	28	9 12 46	7 24 4·88	−·052	119 55 34·6	+·241	E.
	29	9 20 45	7 21 4·54	·050	119 48 44·8	·230	E.
	30	9 56 47	7 18 2·64	·042	119 40 35·3	·174	E.
1883.							
January	6	9 58 31	6 58 34·43	·030	118 30 1·6	·142	F.
	7	9 45 46	6 56 1·86	·031	118 17 57·7	·148	F.
	9	9 52 13	6 51 0·33	·027	117 52 50·2	·140	F.
	10	9 18 2	6 48 38·50	·033	117 39 41·8	·168	F.
	13	9 7 52	6 41 42·47	·031	116 58 24·5	·172	F.
	14	8 59 40	6 39 31·93	·030	116 43 56·5	·180	F.
	27	8 44 15	6 16 2·51	·017	113 20 41·5	·194	F.
	28	8 30 15	6 14 38·49	·019	113 4 39·9	·204	F.
	29	8 31 15	6 13 15·17	·019	112 48 35·7	·204	F.
	„	8 57 5	6 13 13·77	−·011	112 48 1·5	·195	E.
February	2	12 5 54	6 8 3·34	+·040	111 41 7·3	·286	E.
	3	11 35 51	6 6 57·63	·034	111 25 26·1	·260	E.
	4	11 42 49	6 5 52·22	·037	111 9 15·3	·285	E.
	5	11 40 19	6 4 50·57	·038	110 53 15·8	·289	E.
	„	12 12 18	6 4 49·43	·043	110 53 1·1	·320	F.
	6	11 54 2	6 3 50·98	·042	110 37 14·7	·311	E.
	7	12 2 33	6 2 54·81	·043	110 21 23·9	·326	F.
	8	11 44 2	6 1 59·80	·042	110 5 49·7	·319	E.
	9	12 18 51	6 1 8·65	·047	109 49 51·2	·359	F.
	10	11 40 0	6 0 21·40	·042	109 34 32·4	·328	F.
	„	12 0 5	6 0 18·11	·046	109 34 21·4	·350	E.
	„	12 0 5	6 0 18·48	·046	109 34 13·8	·350	G.
	11	10 57 42	5 59 33·73	·035	109 19 29·5	·298	E.
	„	10 57 42	5 59 34·15	·034	109 19 36·5	·301	E.
	13	11 8 24	5 58 9·07	·038	108 48 49·8	·326	E.
	14	11 20 7	5 57 28·00	·042	108 33 33·2	·341	E.
	27	11 17 50	5 52 0·30	·027	105 31 29·4	·340	E.
March	3	10 49 42	5 51 16·86	·047	104 39 18·7	·423	E.
	„	11 10 7	5 51 17·31	·049	104 39 4·3	·436	F.
	4	10 8 40	5 51 16·28	·041	104 27 21·3	·395	E.
	6	10 0 18	5 51 0·79	·041	104 2 56·2	·396	E.
	„	10 30 0	5 51 1·85	·046	104 2 48·3	·415	F.
	8	9 19 44	5 50 58·07	·034	103 39 24·5	·387	E.
	9	10 54 42	5 50 58·14	·050	103 27 4·9	·451	E.
	11	11 3 40	5 51 3·58	·053	103 4 16·3	·467	E.
	13	9 3 9	5 51 13·45	·035	102 43 13·9	·398	F.
	„	9 32 17	5 51 11·35	·041	102 42 50·3	·415	E.
	14	9 26 9	5 51 17·71	·041	102 32 8·4	·415	E.
	„	9 54 0	5 51 19·70	·045	102 32 7·0	·432	F.
	15	10 49 20	5 51 30·31	·052	102 21 5·0	·475	F.
	„	11 24 36	5 51 25·96	·055	102 20 43·6	·497	E.
	28	8 48 12	5 54 34·66	·041	100 17 10·0	·450	E.
	„	8 50 51	5 54 35·48	041	100 17 4·9	·450	F.
	29	7 57 4	5 54 54·03	·034	100 8 44·9	·431	E.
	„	8 27 28	5 54 55·24	·040	100 8 50·7	·443	F.
	30	8 44 16	5 55 17·25	·042	100 0 13·3	·455	E.
	„	9 4 6	5 55 18·40	·045			F.
	31	8 47 19	5 55 38·17	·044	99 52 2·0	·457	F.
	„	9 29 36	5 55 39·12	+·050	99 51 46·0	+·481	E.

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TABLE III*b*—*continued.*

Date.	Cape Mean Time.	Right Ascension.	Parallax Factor in R.A.	North Polar Distance.	Parallax Factor in N.P.D.	Observer.
1883.	h m s	h m s		° ′ ″		
April 4	8 33 31	5 57 16·13	+·045	99 20 31·6	+·464	E.
5	9 13 18	5 57 17·35	·049	99 20 19·5	·484	F.
5	8 30 18	5 57 35·79	·043	99 12 56·4	·469	E.
,,	8 38 30	5 57 41·59	·044	99 12 59·7	·470	F.
6	8 50 29	5 58 6·71	·046	99 5 22·4	·479	E.
7	8 5 21	5 58 33·59	·039	98 58 19·3	·459	F.
,,	8 47 10	5 58 32·93	·047	98 58 0·7	·480	E.
9	7 37 49	5 59 27·07	·037	98 44 10·0	·455	E.
,,	8 20 9	5 59 28·52	·044	98 44 0·7	·472	F.
29	7 40	6 10 25·5	·048	96 49 9	·503	F.
,,	7 40	6 10 26·1	·048	96 48 47	·503	E.
30	7 18 22	6 11 4·0	·046	96 46 20	·498	E.
,,	7 26 47	6 11 7·5	·047	96 46 25	·500	F.
May 1	7 23	6 11 42·0	·048	96 41 2	·507	F.
,,	7 23	6 11 40·3	·048	96 40 50	·507	E.
2	7 5	6 12 21·6	·043	96 37 2	·493	E.
,,	7 5	6 12 17·9	·043	96 37 47	·493	F.
12	7 20	6 18 49	+·051	96 0 (2)	+·516	E. F.

OBSERVATIONS WITH THE HELIOMETER.—W. L. ELKIN.

PRELIMINARY REMARKS, with especial Reference to the Form of the NUCLEUS, and DESCRIPTION of the SKETCHES, Plate I.

The only micrometical comparison I could obtain before Perihelion was that on Sept. 8. At that time the nucleus presented the appearance of a globular nebulous mass, strongly condensed in the centre, and according to both my recollection and a rough sketch made at the time, sensibly round. This sketch is reproduced in Fig. 1, the dimensions being estimated by means of the wires in the focus of the heliometer. These wires formed a square of 100″ side, and were each 5″ thick, so that both for larger and smaller dimensions a convenient unit was available. The centre and brightest portion of the nucleus formed an object which could be very accurately bisected by a star, and the separate pointings agree remarkably well among themselves, a power of 180 being used on this occasion.

I did not see the Comet again until after sunrise on Sept. 16 and 17, when of course no comparison stars were visible. I unsuccessfully attempted to refer the Comet to the limbs of the Sun, although it was possible to follow it right up to the Sun's edge. With reference to this observation, I may say that the more brilliant portions of the jets from the nucleus proper on the side towards the Sun were always seen until the Comet actually touched the Sun's limb, when they, of course, disappeared first. The time, $4^h\ 50^m\ 52^s$ Cape M. T. may be taken, I think, as corresponding to a distance of 950″ from the Sun's centre of the same point observed on Sept. 8, with an uncertainty of not more than 1·0

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or 1″·5 at most. This assumes the Sun's Radius 957″·5 according to the Nautical Almanac.

The first morning after perihelion on which comparison stars were visible was Sept. 28. No change in the form of the nucleus was noticed on this date, and I feel confident that it could not have been elongated more than to form an oval of the relative dimensions 2 : 3 The point observed on this occasion therefore, the centre of the condensation, is not likely to be more than 1″, or 2″ at most, distant from that observed up to this date. The power 60 was used here and henceforth.

On Sept. 30 the nucleus was noted to be oval, and from the sketch made the longer dimensions appears to be about twice the smaller. This sketch is given in Fig. 2, the breadth or smaller dimension of the oval being assumed the same as the estimation of the following day. The direction of the elongation formed an angle of about 15° with the axis of the tail at the head of the Comet from which its position angle would result about 95°. The double character of the nucleus was, however, remarked by Mr. Finlay with the 6-inch the same morning, and he even took one of the condensations for his point of observation. The point, I observed, the centre of the oval mass, will therefore differ from his about 3″ in R.A.

On Oct. 1 the nucleus was easily seen to consist of two condensations, and their dimensions carefully estimated as in Fig. 3. The preceding condensation was slightly the less brilliant, and the distance between the two judged to be about 10″, their position angle 100°. No measures were, however, secured on this or the following morning.

On Oct. 3 the separation of the two masses was very conspicuous, and the distance between the brightest parts estimated 13″, Fig. 4. The preceding condensation was much elongated, diffused and considerably fainter than the following one which was therefore chosen as the point of reference. No position angle was measured, but it could not have been far from 97°.

On Oct. 10 the nucleus appeared as in Fig. 5; the distance between the two main centres of condensation being estimated 15″. The position angle of the line joining them was measured 97°·5. The star, employed to fix the Comet's position was almost exactly in this direction, so that the position angle of both condensations could be assumed the same with reference to the star, and the difference of their distances from the star gave their relative distance immediately. I therefore measured them both, and as seen from the Table of Observations, found this difference to be 15″·6, in agreement with the estimation above cited.

On Oct. 11, the following condensation was the one to which the comparisons refer, and the same applies to all the observations up to Nov. 11. The successive appearances of the nucleus as seen in the heliometer form the remaining figures, excepting Fig. 7. It must be understood, however, that these are given principally for the purpose of showing to what point in the longer axis of the elongation my observations refer, transversely to this axis the distribution of light was always sensibly symmetrical. I have therefore drawn a line through all the figures at the point I tried to observe. With the larger telescopes of the observatory of 6 and 7 inches aperture (the equivalent aperture of one of the half-lenses of the heliometer is only about 2·9 inches) considerably more detail could always be seen. For instance, Fig. 7 shows the appearance of the nucleus on Oct. 12, as seen with the 6-inch Grubb. On that date the preceding condensation could distinctly be seen to consist of 3 nodules or knots of light, of which the respective distances from the following, still well defined, condensation were 7″·3, 14″·0, and 21″·5, whilst with the heliometer

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only occasionally this subdivision could be suspected. On some occasions, however, several distinct knots could be made out with the heliometer, as on Oct. 17, 19, and 21, and with the 7-inch Merz condensations were recognisable as late as in February, 1883.

The gradual increase in the amount of diffused light around the nucleus as well as the great augmentation of size will be apparent from these sketches drawn to scale as they are. By Nov. 11 the following condensation, which till the end of October was a fair object for observation, had become so covered with haze, that it was obvious that soon nothing but the centre of the great mass would be available for a reference point, so I commenced to observe this latter as best I could, and after Nov. 18 gave up using this following condensation, the place of which for the last week had been more guessed at than actually seen. I continued the observations with the heliometer until Nov. 21, and then took them up with the 7-inch equatorial, the results of which will be found elsewhere. It is clear that these latter results cannot be used in conjunction with those where a fairly definite point could be employed. Up to Oct. 26, I think, my observations may be considered as certainly referring to one and the same physical point, the only exceptions being that of Sept. 30 which will need a correction of about + 3″ in R. A. to the resulting comet's place, and the second one on Oct. 10. I think it somewhat doubtful whether the observations in the early part of November refer to this same point, and still more so whether those made as late as Nov. 11 to Nov. 18 do. What value those referring to the centre of the nucleus may have, including those made with the 7-inch refractor up to May 1883, I cannot pretend to say.

I have collected in a tabular form the results I have obtained for the length of the brighter portion of the nucleus, and for the position angle of the elongation of the same. Up to Nov. 23 the length is derived from the sketches made with the heliometer; after that from measures with the filar-micrometer of the 7-inch refractor. Except the two first all the position angles are from measurements.

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Table IV.

Observations with the Heliometer.

Date.	Cape M.T.	Distance.	Pos. Angle.	Δα.	Δδ.	Star.	Nucleus.
1882.	h m s	″	° ′	″	″		
Sept. 8	17 13 58	5645·5	102 10·9	+5518·9	−1191·3	1	c
28	16 47 17	1659·6	322 48·6	−1008·5	+1321·9	2	c
30	16 23 36	5719·6	334 52·6	−2449·7	+5178·6	3	c
Oct. 3	16 1 1	643·9	203 10·8	− 256·1	− 591·9	4	f
10	16 0 25	4433·2	279 41·8	−4459·1	+ 746·7	5	f
10	16 0 25	4448·8	279 41·8	−4474·6	+ 749·3	5	p
11	16 35 14	5660·2	261 47·7	−5721·0	− 807·8	5	f
12	16 1 50	3335·5	144 13·3	+1992·6	−2706·1	6	f
15	15 40 44	5695·2	252 36·5	−5583·1	−1102·3	7	f
15	16 2 30	3213·6	107 40·6	+3146·7	− 975·8	8	f
17	15 37 25	2528·9	24 56·5	+1102·0	+2293·1	9	f
19	15 49 21	1380·6	245 40·5	−1302·3	− 568·7	9	f
19	16 7 6	7185·0	305 59·6	−6037·3	+4222·6	10	f
20	15 26 24	1606·2	75 11·4	+1611·5	+ 410·6	11	f
20	15 45 50	3123·6	230 42·4	−2504·8	−1978·1	9	f
21	15 52 35	4938·2	226 47·1	−3732·3	−3381·4	9	f
21	16 7 31	1085·5	161 23·8	+ 359·7	−1028·8	11	f
22	15 20 32	940·8	264 4·0	− 974·3	− 97·3	12	f
22	15 37 46	3788·0	82 50·9	+3915·7	+ 471·6	13	f
24	15 26 29	1089·2	76 8·6	+1105·9	+ 260·9	14	f
24	15 42 2	3460·4	53 19·7	+2906·5	+2066·7	15	f
26	14 37 38	702·7	147 28·0	+ 396·7	− 592·5	15	f
31	14 31 8	1102·5	336 12·3	− 472·5	+1008·8	16	f
31	14 45 37	1807·1	159 30·0	+ 672·9	−1698·3	17	f
Nov. 1	15 52 48	1086·9	122 59·0	+ 969·5	− 591·7	18	f
1	16 6 32	1912·2	258 32·6	−1993·3	− 379·8	16	f
2	15 50 28	1937·3	193 41·7	− 488·3	−1882·2	18	f
2	16 6 48	1331·4	36 36·7	+ 847·6	+1068·7	19	f
4	16 3 12	1577·7	219 21·1	−1070·6	−1220·0	21	f
7	15 33 48	1659·8	328 25·8	− 939·0	+1414·2	22	f
7	15 50 51	3797·5	262 4·1	−4056·6	− 524·0	23	f
8	13 33 47	1958·4	120 38·6	+1820·2	− 998·2	24	f
8	13 46 48	2295·5	276 55·8	−2465·2	+ 277·0	22	f
10	13 12 54	154·1	234 38·0	− 136·5	− 89·2	25	f
10	13 30 23	878·3	186 29·6	− 107·8	− 872·6	26	f
11	13 44 46	146·7	104 42·0	+ 154·6	− 37·2	27	f
11	13 49 4	123·0	105 22·0	+ 129·2	− 32·6	27	c
12	13 3 20	1892·4	231 42·8	−1619·8	−1172·6	27	f
13	13 1 28	3951·2	233 29·4	−3469·5	−2350·8	27	f
13	13 16 40	1564·4	71 47·3	+1628·0	+ 488·8	28	f
13	13 20 49	1543·0	71 19·1	+1601·4	+ 494·3	28	c
14	12 48 45	673·1	198 38·8	− 236·2	− 630·9	28	f
14	12 54 27	677·5	200 57·7	− 265·9	− 632·6	28	c
14	13 15 17	1616·9	337 8·2	− 690·7	+1489·8	29	c
16	13 34 48	1023·5	66 57·1	+1040·0	+ 400·8	30	f
16	13 34 48	1010·9	66 12·0	+1020·7	+ 408·0	30	c
18	12 33 54	1139·5	310 46·6	− 956·4	+ 741·2	31	f
18	12 33 54	1159·7	310 46·6	− 973·5	+ 757·4	31	c
19	12 27 24	2773·7	263 44·1	−3063·4	− 302·7	31	c
20	13 32 33	2656·7	162 3·1	+ 909·4	−2527·4	32	c
21	12 24 45	3470·0	73 36·6	+3721·9	+ 979·2	33	c

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The heliometer observations consist as a rule of 4 pointings in distance and 4 in position angle; these were all made separately and reduced to the same epoch by means of the known motion of the comet. In the last column "nucleus" the letters c, f, and p, denote respectively the centre, the following and the preceding condensation of the nucleus, the same letters being used in Figs. 5 and 13 for the same purpose.

TABLE IV*a*.

MEAN PLACES of COMPARISON STARS.

Star.	R.A.	Declination.	Authority.
	h m s	° ′ ″	
* 1	9 33 43·54	− 0 35 55·76	Stone.
* 2	10. 46 53·34	6 11 21·56	Cape Obs.
* 3	10 44 16·93	8 15 44·29	Stone.
* 4	10 36 32·69	8 6 38·45	Paris.
* 5	10 30 39·85	11 35 51·20	Cape Obs.
* 6	10 20 34·30	11 28 37·02	,,
* 7	10 25 12·36	12 59 4·40	Bessel.
* 8	10 15 28·70	13 11 35·40	Paris.
* 9	10 15 8·00	14 53 53·30	Cape Obs.
*10	10 20 17·18	16 13 27·39	Stone.
*11	10 10 34·12	15 33 17·44	Cape Obs.
*12	10 10 44·08	16 11 18·17	,,
*13	10 5 16·85	16 21 1·89	,,
*14	10 5 38·14	17 3 16·08	,,
*15	10 3 37·08	17 33 36·19	,,
*16	9 57 3·13	19 51 15·73	,,
*17	9 55 45·90	19 6 25·54	,,
*18	9 53 45·72	19 47 32·92	,,
*19	9 50 45·78	20 28 4·10	Oeltz. Arg.
*21	9 51 2·79	20 41 39·89	Cape Obs.
*22	9 45 36·77	22 27 56·60	Oeltz. Arg.
*23	9 49 3·56	21 55 49·70	Cape Obs.
*24	9 40 51·54	22 6 33·70	Oeltz. Arg.
*25	9 39 15·26	23 1 56·40	,,
*26	9 39 12·97	22 49 9·80	,,
*27	9 36 56·15	23 23 18·40	,,
*28	9 31 14·78	24 10 36·52	Stone.
*29	9 31 41·83	24 46 8·44	,,
*30	9 25 24·30	25 5 51·94	,,
*31	9 23 10·51	25 47 2·49	Cape Obs.
*32	9 16 16·14	25 27 49·76	Stone.
*33	9 10 49·38	−26 42 17·99	,,

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TABLE IV*b*.

RESULTING PLACES OF COMET 1882. II.

Date.	App. R.A.	log. *f.p.*	App. Dec.	log. *f.p.*
1882.				
September 8	144° 59′ 51″·6	[9·911 *n*]	− 0° 56′ 30″·2	[9·743 *n*]
28	166 27 1·0	[9·917 *n*]	5 49 31·7	[9·732 *n*]
30	160 25 24·4	[9·921 *n*]	6 50 15·4	[9·733 *n*]
October 3	159 4 25·0	[9·922 *n*]	8 16 42·0	[9·731 *n*]
10	156 26 11·4	[9·917 *n*]	11 23 35·6	[9·704 *n*]
10	156 25 55·9	[9·917 *n*]	11 23 33·0	[9·704 *n*]
11	156 5 9·8	[9·892 *n*]	11 49 30·1	[9·679 *n*]
12	154 42 20·9	[9·912 *n*]	12 13 54·0	[9·693 *n*]
15	154 45 36·7	[9·917 *n*]	13 27 37·5	[9·691 *n*]
15	154 45 12·0	[9·905 *n*]	13 28 1·7	[9·675 *n*]
17	154 5 57·3	[9·915 *n*]	14 15 50·4	[9·677 *n*]
19	153 25 53·7	[9·903 *n*]	15 3 32·3	[9·658 *n*]
19	153 25 49·0	[9·885 *n*]	15 3 51·5	[9·641 *n*]
20	153 5 59·8	[9·915 *n*]	15 26 36·9	[9·668 *n*]
20	153 5 51·5	[9·900 *n*]	15 27 1·7	[9·652 *n*]
21	152 45 24·5	[9·892 *n*]	15 50 25·1	[9·639 *n*]
21	152 45 8·4	[9·877 *n*]	15 50 36·3	[9·625 *n*]
22	152 25 24·1	[9·913 *n*]	16 13 5·5	[9·659 *n*]
22	152 25 5·8	[9·901 *n*]	16 13 20·1	[9·646 *n*]
24	151 43 36·1	[9·902 *n*]	16 59 4·9	[9·638 *n*]
24	151 43 20·8	[9·890 *n*]	16 59 19·0	[9·626 *n*]
26	151 1 31·8	[9·928 *n*]	17 43 38·4	[9·671 *n*]
31	149 8 35·6	[9·922 *n*]	19 34 36·2	[9·634 *n*]
31	149 8 22·7	[9·912 *n*]	19 34 53·2	[9·618 *n*]
November 1	148 43 17·0	[9·827 *n*]	19 57 33·9	[9·528 *n*]
1	148 43 15·2	[9·800 *n*]	19 57 44·9	[9·511 *n*]
2	148 18 59·7	[9·818 *n*]	20 19 4·5	[9·516 *n*]
2	148 18 40·3	[9·792 *n*]	20 19 28·0	[9·496 *n*]
4	147 28 34·3	[9·787 *n*]	21 2 9·1	[9·475 *n*]
7	146 9 17·0	[9·804 *n*]	22 4 31·3	[9·473 *n*]
7	146 9 1·2	[9·785 *n*]	22 4 42·8	[9·448 *n*]
8	145 43 58·5	[9·937 *n*]	22 23 20·8	[9·630 *n*]
8	145 43 51·2	[9·929 *n*]	22 23 28·6	[9·612 *n*]
10	144 47 18·6	[9·943 *n*]	23 3 34·5	[9·639 *n*]
10	144 47 13·0	[9·935 *n*]	23 3 51·3	[9·615 *n*]
11	144 17 23·5	[9·920 *n*]	23 24 4·4	[9·579 *n*]
11	144 16 58·1	[9·917 *n*]	23 23 59·8	[9·575 *n*]
12	143 47 49·6	[9·948 *n*]	23 43 0·0	[9·640 *n*]
13	143 17 0·5	[9·943 *n*]	24 2 38·3	[9·621 *n*]
13	143 16 37·6	[9·935 *n*]	24 2 36·4	[9·597 *n*]
13	143 16 11·0	[9·932 *n*]	24 2 30·9	[9·590 *n*]
14	142 45 33·8	[9·949 *n*]	24 21 23·2	[9·630 *n*]
14	142 45 4·1	[9·946 *n*]	24 21 9·1	[9·620 *n*]
14	142 44 44·9	[9·934 *n*]	24 21 27·3	[9·587 *n*]
16	141 39 14·0	[9·905 *n*]	24 59 19·8	[9·523 *n*]
16	141 38 54·7	[9·905 *n*]	24 59 12·6	[9·523 *n*]
18	140 32 31·7	[9·901 *n*]	25 34 47·1	[9·503 *n*]
18	140 32 14·6	[9·901 *n*]	25 34 33·9	[9·503 *n*]
19	139 57 25·1	[9·949 *n*]	25 52 14·1	[9·601 *n*]
20	139 20 3·4	[9·886 *n*]	26 10 6·1	[9·470 *n*]
21	138 45 15·0	[9·946 *n*]	26 26 7·4	[9·581 *n*]

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TABLE IVc.

Date.	Length of Nucleus.	Position Angle of Elongation.
1882. Sept. 30	10″	95°±
Oct. 1	15	100±
3	20	—
10	20	97·5
12	25	101·3
15	30	—
17	40	101·5
19	55	105·7
20	—	103·5
21	60	105·1
22	—	105·6
24	—	107·3
26	—	105·6
31	70	107·7
Nov. 1	—	117·6
4	—	103·3
7	65	113·0
8	—	115·7
10	90	117·8
11	—	120·2
12	90	114·8
13	90	120·5
14	95	119·9
16	—	122·1
18	100	129·4
19	—	122·0
20	100	122·8
21	105	135·5
23	—	138·5
24	102	140·4
27	103	144·1
28	119	146·5
29	—	146·6
Dec. 1	95	148·8
4	110	152·8
8	119	161·0
9	106	162·2
10	132	163·1
12	—	166·8
13	128	168·0
15	107	169·9
16	135	172·7
17	120	175·6
24	—	188·0
28	135	193·2
30	118	195·1
1883. Feb. 2	140	238·0
3	—	235·6
4	—	243·0
5	—	249·2
8	—	246·4
10	165	243·0
12	172	248·6
13	—	253·7

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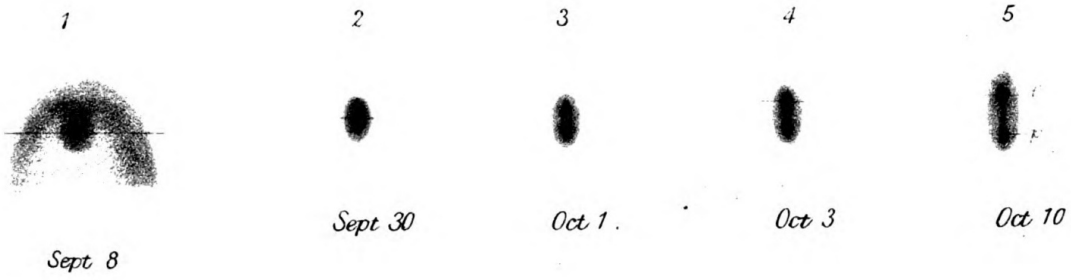
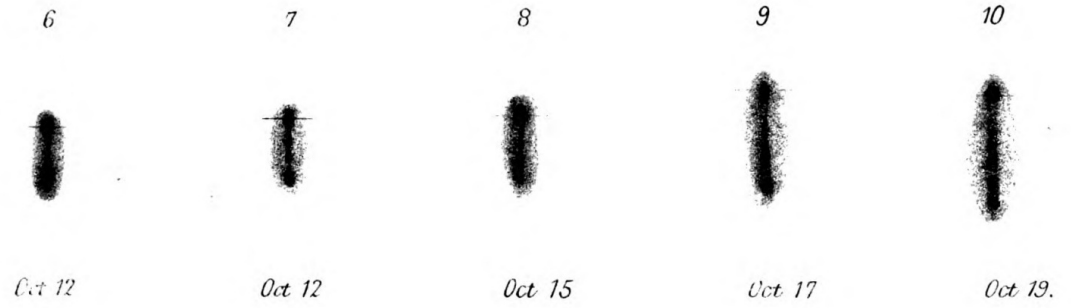
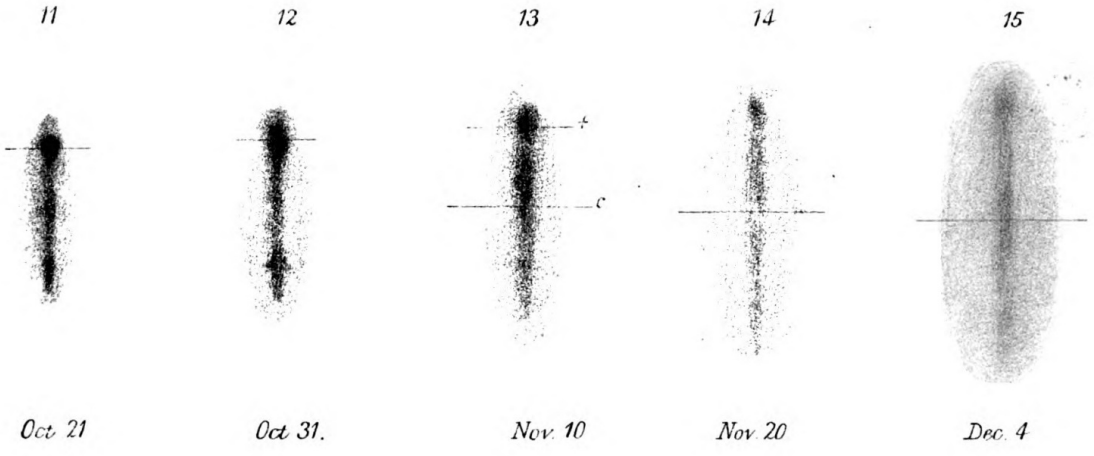
Nucleus of Great Comet 1882. II.

(W.L. Elkin.)







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Great Comet 1882.

Details of Head.

(W.H. Finlay)

Sept. 8d 17h

Sept. 18d 0h
(Theodolite)

Sept 30d 17h

Oct. 1.

Oct. 9

Oct. 10

Oct. 12

Oct. 13

Oct. 16

Nov 1.

(Curvature of line of Nodes)

Engd. Langfield Lith London 1883 12/83

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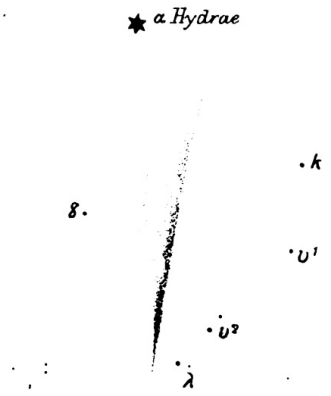
Great Comet 1882.

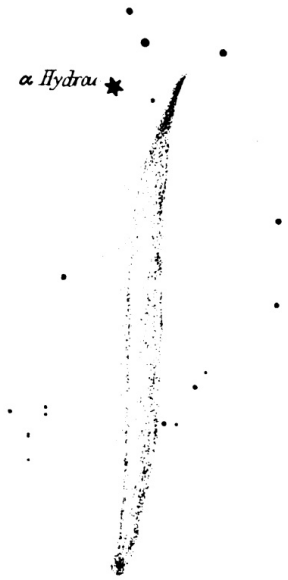
(W H Finlay.)

Oct. 1.

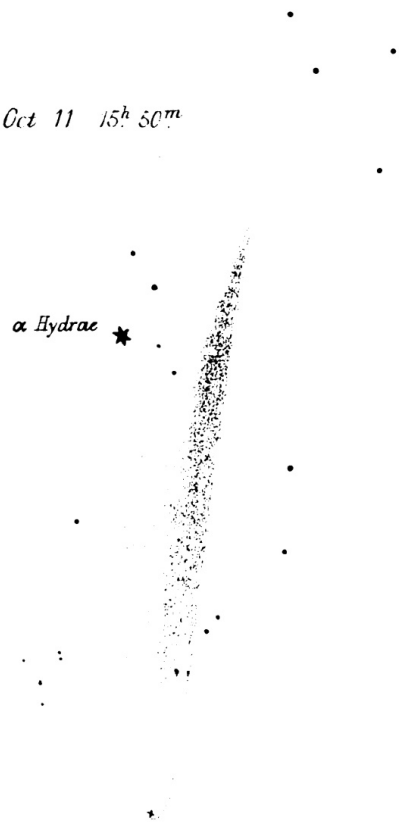
Oct 9. 16h c. m. t.



Oct 10. 15h 10m c. m. t.



Oct 11 15h 50m



1883. Jan 28. 9h c. m. t.

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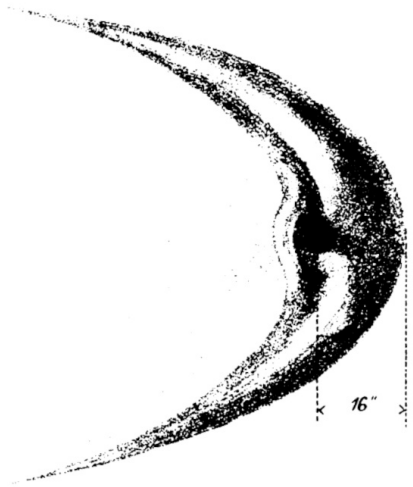
Great Comet of 1882 Sept.r 18.d 2.h 40.m Cape M T.

(D. Gill.)



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Nº 1.

1882 Oct 19d

Nº 2.

1882 Oct 20d.

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N° 3.

1882 Oct 21^{d}.

N° 4.

1882 Nov 7^{d}.

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Nº 5.

1882 Nov. 13^{d}

Nº 6.

1882 Nov 14^{d}

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